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FOR

MEDICAL SERVICING SYSTEM

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DESCRIPTION OF THE INVENTION

Field of the Invention

[001] The present invention relates to medical servicing systems and, more particularly, to an improved ceiling or wall mounted medical servicing system having a detachable equipment support assembly. The invention is particularly applicable for use in operating rooms during surgical procedures or the like and will be described with reference thereto. However, it is to be understood that the present invention is useful in a variety of situations, environments, and applications wherever electrical, pneumatic, or other equipment is needed, including non-medical uses and environments such as industrial and commercial applications.

Background of the Invention

[002] One challenge facing medical practitioners and hospitals involves reducing the time required to safely perform medical procedures. This time reduction is beneficial to the patient by reducing the possibility of surgical complications, and beneficial to the hospital by allowing more procedures to be preformed in a given day. Accordingly, there is a need to find ways to make an operating room as efficient as possible before, during, and after a medical procedure. In this regard, the efficiency of an operating room can be improved by properly positioning, organizing, supporting, connecting, and moving commonly used medical equipment and services required in the operating room. Technological advances, however, have made it difficult to safely and centrally position and organize all of the medical instruments now used by medical practitioners. For

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example, most operating rooms are not properly configured to easily and centrally locate devices such as display monitors (that require connection with data lines feeding video) with other pneumatic, hydraulic, or electrically driven equipment. Further, many new medical products require additional electrical, fluid, and data connections. Efficiently and safely positioning, organizing, supporting, and moving these types of equipment, and other conventional medical equipment, remains a challenge in the operating room.

[003] Attempts at efficiently and safely positioning and organizing medical equipment in an operating room include using various types of medical servicing systems. Medical servicing systems can be as simple as a mobile cart, or can be as complex as a support unit that is movable horizontally and vertically by way of a suspension system that is fixedly connected to a ceiling of an operating room. One such suspended system is described in U.S. Patent No. 6,196,649 to Block et al. While suspended systems save valuable space in the operating room, and are beneficial for many other reasons, they are restricted by the sphere of movement permitted by its suspension system. Further, these suspended systems can be difficult to move to a desired location due to their weight and degrees of freedom. Finally, shelves provided with conventional support assemblies typically are not space efficient or readily adaptable for different sized instruments or advances in medical instrument technology.

[004] Accordingly, there is a need for a medical servicing system that is easy to operate, is able to efficiently position, organize, and support medical instruments and services, is adaptable to support today's and tomorrow's

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technology, and allows efficient movement of the supported instruments and services before, during, and after a medical procedure.

SUMMARY OF THE INVENTION

[005] In accordance with an aspect of the invention, a servicing system comprises a suspension system connected to an overhead support structure and provides a path for at least one of an electric line, fluid line, or data line; a service module coupled to the suspension system and comprising at least one connector for allowing access to electricity, fluid, or data from the at least one electric line, fluid line, or data line; an equipment support assembly removably coupled to the service module for supporting equipment; and a mobile platform for receiving the equipment support assembly upon decoupling of the equipment support assembly from the service module.

[006] Further in accordance with another aspect of the present invention, a method of decoupling an equipment support assembly from a suspension system comprises positioning a mobile platform underneath the equipment support assembly; raising a portion of the mobile platform vertically into engagement with the equipment support assembly; and moving the mobile platform and equipment support assembly away from the overhead suspension system.

[007] Further in accordance with yet another aspect of the present invention, a shelf for a service system comprises a shelf length dimension and a shelf width dimension; at least two arm members extending generally in a direction of the shelf length dimension; a clamping assembly coupled to the at least two arm members and extending generally in a direction of the shelf width dimension; and a

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coupling assembly attached to the arm members for coupling the shelf to the service system.

[008] Yet further in accordance with an aspect of the present invention, a shelf assembly for a service system comprises a support column having at least a front portion, a rear portion, and a bottom portion; a coupling arrangement for assisting in attaching and detaching the shelf assembly to the service system; and at least one shelf member for supporting equipment.

[009] Further in accordance with another aspect of the present invention, a floor located mobile support device comprises a vertically adjustable base member for supporting an equipment support assembly of a service system, and a coupling arrangement located on the base member for coupling the mobile support device to a bottom portion of the equipment support assembly.

[010] Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

[011] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

[012] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one embodiment of the invention and together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[013] Fig. 1 is a perspective view of an embodiment of the medical servicing system according to the present invention;

[014] Fig. 2 is a side view of an embodiment of the suspension system and service module illustrated in Fig. 1;

[015] Figs. 3A - 3D are right side, left side, front, and rear views, respectively, of the service module illustrated in Fig. 1;

[016] Fig. 4 is a side view of a the equipment support assembly of Fig. 1;

[017] Fig. 5 is a rear view of the support column of the equipment support assembly of Fig. 1

[018] Fig. 6 is a top view of a shelf member of the equipment support assembly of Fig. 1;

[019] Fig. 7 is a top view of a monitor shelf according to the present invention; and

[020] Fig. 8 is a front view of the support column and mobile platform of Fig. 1.

DESCRIPTION OF THE EMBODIMENTS

[021] Reference will now be made in detail to embodiments of the invention, an example of which is illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[022] Fig. 1 illustrates a perspective view of the medical servicing system 10 in accordance with the present invention. "Servicing system" as defined herein

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includes any system that facilitates or assists in providing desired services, such services including, but not limited to, positioning, organizing, supporting, or moving equipment and delivering electricity, fluid, or data to a desired location. Accordingly, medical servicing system 10 may be used to position, organize, support, and move commonly used medical equipment and to deliver electricity, fluid, or data to desired locations in an operating room. Medical servicing system 10 may include an overhead suspension system, generally indicated at 20, a service module, generally indicated at 100, a detachable equipment support assembly, generally indicated at 150, and a mobile platform 200 for decoupling and moving equipment support assembly 150 from service module 100. Suspension system 20 may be fixedly secured to structural reinforcement members in a ceiling 22, or to other suitable supports, such as, for example, a wall of an operating room or the like. Service module 100 may be attached at a distal end of suspension system 20 and have attached thereto detachable equipment support assembly 150.

[023] Referring to Fig. 2, overhead suspension system 20 may include a mount 24 for connecting suspension system 20 to ceiling 22. "Overhead" suspension system as defined herein includes any type of suspension system that is not directly coupled to a floor of the room or facility in which the suspension system is located. Mount 24 may include any suitable fastening arrangement, including, for example bolts 26 for securing suspension system 20 to ceiling 22. A horizontal arm 28 may be rotatably coupled to mount 24 by way of a vertical connector 30 coupled between horizontal arm 28 and mount 24. Rotation of horizontal arm 28 is about axis 32, as indicated by arrow A in Fig. 2. A distal end 34 of horizontal arm 28 may

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be connected to a further vertical connector 36. Vertical connector 36 includes a lower portion 38 coupled to a distal arm 40 by way of a joint 42 that allows distal arm 40 to rotate about an axis 44 and rotate in a vertical plane about joint 42. Motion of distal arm 40 is indicated by arrows B and C in Fig. 2. Joint 42 and the coupling of vertical connector 30 to horizontal arm 28 may be formed in any conventional manner as long as they provide the required degrees of freedom, i.e. rotation of horizontal arm 28 and rotation and vertical movement of distal arm 40. It will be appreciated that stops may be included to prohibit horizontal arm 28 and distal arm 40 from rotating a full 360 degrees, which may avoid detrimental twisting of components within suspension system 20. Further, each of the arms 28, 40 may be held in position in a conventional manner using, for example, pneumatic brakes or the like.

[024] The vertical movement of distal arm 40 may be controlled by a motor (not shown). Control of the motor may be provided on service module 100, or at any other appropriate location on or separate from the medical servicing system 10, such as, for example, on a wall of the room where service system 10 is located. According to one embodiment of the present invention, control of suspension system 20 may be provided by a control panel 101 mounted on a handle member 130 attached to service module 100. Control panel 101 may include manually actuatable pushbuttons 102 and 104 that control pneumatic brakes, and a manually actuatable toggle switch 106 for controlling the motorized vertical height of distal arm 40. Pushbuttons 102 and 104 may be used to each respectively control one of the pneumatic brakes of each of horizontal arm 28 and distal arm 40 to lock the arms at

a desired rotational position. As is well known in the art, the pneumatic brakes release when the pushbuttons 102 and 104 are depressed. The toggle switch 106 may be a momentary type so that vertical motion is enabled only when an operator presses and holds the switch in a downward or upward position.

[025] A distal end 46 of distal arm 40 may be connected to a vertical coupling member 48 for coupling service module 100 to suspension system 20. Vertical coupling member 48 may be of any conventional configuration, for example a tubular or I-beam configuration, and may allow relative rotational movement between service module 100 and suspension system 20 about axis 50, as indicated by arrow D in Fig. 2.

[026] Horizontal arm 28, distal arm 40, and the connectors and coupling members attached thereto (30, 36, and 48) of suspension system 20 may define an internal conduit 52 (shown in dashed lines) for allowing one or more electric lines 54, fluid lines 56, and data lines 58 to run from ceiling 22 to service module 100. "Line" as defined herein includes any type of pipe, cable, wire, conduit, cord, or other appropriate structure that permits the desired flow or transfer. Electric, fluid, and data lines 54, 56, and 58 deliver electricity, fluid, and data to and from patients, medical equipment or information systems during surgical procedures. For example, low and high voltage can be carried along electric lines 54, a vacuum, gases such as NO_2, O_2, CO_2, HeO_2, and N_2, or liquid, may be supplied along fluid lines 56, and video, telephone, or other data can be carried along data lines 58. It is appreciated that other types of lines useful in the given environment can run through internal conduit 52 from ceiling 22 to service module 100. Electric, fluid, and data lines 54,

56, and 58 may alternatively be run along the outside surface of suspension system 20 to service module 100 instead of through internal conduit 52. It is appreciated that proper safeguards may be included to properly separate any fluid lines 56 delivering combustible fluid from any electric lines 54 of the system. For example, a physical barrier may be included within mount 24, internal conduit 52, and service module 100 to separate any nitrogen fluid lines from any high and low voltage electric lines.

[027] As an alternative embodiment of the suspension system 20 described above, distal arm 40 and vertical coupling member 48 may be omitted so that vertical connector 36 is directly coupled to service module 100. In this embodiment of the invention, vertical connector 36 could be formed of an appropriate length to locate service module 100 at an optimum height, or could be formed as a telescoping type connector capable of varying length, thus allowing for an adjustable height of service module 100. Further, service module 100 may be connected to ceiling 22 or other support structure by any number of support arms depending on the amount of desired system movement. For example, service module 100 may be directly coupled to ceiling 22 by a single vertical connecting member.

[028] Figs. 3A - 3D illustrate an embodiment of service module 100 in accordance with the present invention. "Service module" as defined herein includes any structure or device that assists or facilitates the providing of the desired service or services. Service module 100 may be configured about vertical axis 50 (Fig. 3C) and include side panels 110, 112, a front face 114, and a rear face 116. Front face 114 may include a recessed central portion 118 and two opposing angled panels

120, 122 connecting recessed central portion 118 to side panels 110, 112. Similarly, rear face 116 may include a central portion 124 and two opposing angled panels 126, 128 connecting central portion 124 of rear face 118 to side panels 110, 112. As mentioned above, service module 100 may include a handle member 130 attached to one or both of side panels 110, 112. Handle members 130 enable a medical practitioner or assistant to move service module 100 along the degrees of freedom provided by suspension system 20. For example, service module 100 may be moved into and out of the surgical field, toward or away from the operating table or into any other position as desired. As noted above in connection with Fig. 2, one handle member 103 may include a control panel 101 for controlling the movement of suspension system 20.

[029] The service module 100 of the present invention could alternatively be formed of any number of different shapes, such as generally rectangular or elliptical. Further, service module 100 may be formed of any appropriate material that is capable of supporting the required loads of system 10. One such material includes aluminum.

[030] Each side panel 110, 112, and angled panel 120, 122, 126, and 128 may include one or more electrical connectors 132, fluid connectors 134, or data connectors 136. Electrical, fluid, and data connectors 132, 134, and 136 are coupled to their respective lines 54, 56, and 58 which extend from ceiling 22 and along or through suspension system 20 to service module 100. Any combination of electrical connectors 132, fluid connectors 134, or data connectors 136 may be provided on a respective side or angled panel 110, 112, 120, 122, 126, and 128 of

service module 100. For example, as illustrated in Figs. 3A - 3D, the connectors 132, 134, and 136 can be arranged so that only one type of connector is located on any one panel. Further, panels 110, 112, 120, 122, 126, and 128, and central portion 124, may include further connectors or devices, for example, a power switch 138, a phone connector (not shown), a CO_2 bottle holder, an arm member for a flat panel display, or an air vent or filtering device (not shown). In accordance with the present invention, panels 110, 112, 120, 122, 126, and 128 may be interchangable about service module 100 and/or may include a hinge for allowing easy access to a rear portion of the connectors.

[031] Recessed central portion 118 of front face 114 of service module 100 is adapted to receive an equipment support column 152. Figs. 1 and 2 illustrate service module 100 with equipment support column 152 attached thereto. As illustrated in Fig. 3C, recessed central portion 118 may include a plurality of pegs 140 extending normal to the surface of recessed central portion 118. Pegs 140 may be sized to dock with corresponding recesses formed in the rear face of support column 152 and may include a distal portion 141 larger than a proximal portion 143 (shown in dashed lines in Fig. 3C). Recessed central portion 118 may include any number or size of pegs 140 as long as they can maintain secure coupling of support column 152 with service module 100 when equipment support assembly 150 is fully loaded. The details of the docking and undocking of support column 152 with service module 100 are described in further detail below.

[032] Central portion 124 of rear face 116 may include further connectors 132, 136, or 138 and a hinged or detachable door to provide access to the interior of

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service module 100. Such access to the interior of service module 100 allows for simplified maintenance and repair of the interior components of service module 100.

[033] Now referring to Figs. 4-6, detachable equipment support assembly 150 is configured to allow for compact storage of medical devices and may include a support column 152 having a front face 154 and a rear face 156. One embodiment of rear face 156 of support column 152 is illustrated in Fig. 5. "Equipment support assembly" as defined herein includes any structure or device that assists or facilitates supporting the weight of desired equipment. As discussed above, rear face 156 of support column 152 may include recesses 158 having large, lower openings 159 for receiving distal portions 141 of pegs 140 and upper grooves 161 sized to receive proximal portions 143 of pegs 140. Thus, as support column 152 is positioned for docking with service module 100, the larger distal portions 141 of pegs 140 are aligned with lower openings 159 and urged into lower openings 159. Once pegs 140 are fully received within lower openings 159, support column 152 may be lowered (or service module 100 raised) so that smaller proximal portions 143 of pegs 140 align with upper grooves 161 and travel upward to rest against the top portion 163 of upper grooves 161. The location of pegs 140 when properly docked with support column 152 are shown in dashed lines in Fig. 5. It is understood that other types of coupling arrangements of equipment support assembly 150 and service module 100 may be practiced in accordance with this invention, including providing rear face with 156 of support column 152 with a downwardly tapering protrusion that would mate with a corresponding tapered recess in central portion 118 of service module 100. In this embodiment, lowering of support column 152 into the tapered

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recess may serve to couple support column 152 and service module 100 together. In yet another embodiment, downwardly projecting claw members could be provided on support member 152 for mating with upwardly projecting claw members of service module 100. As with the other embodiments, aligning then lowering of support column 152 relative to service module 100 may allow for docking.

[034] Still referring to Figs. 4-6, support column 152 may include two vertical tracks or grooves 160, 162 (Fig. 6) formed within a protruding portion 153 of front face 154. These vertical tracks 160, 162 can receive various different types of servicing components to be described below. One type of servicing component attachable to support column 152 includes a shelf member 164. Shelf member 164 may include a shelf base formed with two horizontally extending arms 168, 170. Horizontally extending arms 168, 170 are connected at a distal end by a connecting plate 172 and at a proximal end by a power module 174. Power module 174 may include one or more service connectors 132, 134, or 136 located on a top, bottom or side surface thereof and may be connectable to appropriate electric, fluid, or data lines 54, 56, and 58 in any conventional manner. A proximal end of power module 174 may be formed in a generally C-shaped configuration to securely mate with protruding portion 153 and tracks 160, 162 of support column 152. In an alternative embodiment of the invention, the base of shelf member 164 may be formed with a single element, rather than two (2) horizontally extending arms 168, 170, with the single element having a width equal to that formed by arms 168, 170.

[035] Referring to Fig. 6, shelf member 164 may also include a clamping assembly generally indicated at 176 for assisting in the securing of a desired

element on shelf member 164. Clamping assembly 176 may be located approximately midway between the proximal and distal ends of shelf member 164 and include two (2) vertically extending clamp plates 178, 180, one on each side of shelf member 164. Clamping assembly 176 may be adjustable to allow clamp plates 178, 180 to move generally horizontally to increase or decrease the distance between vertically extending clamp plates 178, 180. Movement of clamp plates 178, 180 can be achieved, for example, by bracket sets 182, 184 that extend above horizontally extending arms 168, 170 and into a bracket base 171 extending between horizontally extending arms 168, 170. In order to ensure a central support of desired equipment on shelf member 164, bracket sets 182, 184 may be coupled together so that clamp plates 178 and 180 move in unison in the same direction, i.e., together toward the extending arms 168, 170 or together away from the extending arms 168, 170. A rack and pinion type coupling (not shown) could be used between bracket sets 182, 184 to obtain the desired unison movement. Alternatively, coupling of bracket sets 182 and 184 could be omitted to allow individual movement of bracket sets 182, 184. Directional movement of clamp plates 178, 180 and bracket sets 182, 184 is shown by arrows E and F in Fig. 6. Bracket sets 182, 184 may be locked in position by way of an appropriate locking mechanism (not shown). For example, bracket sets 182 and 184, and bracket base 171 could incorporate a screw-type locking mechanism or a releasable spring-type locking mechanism that automatically secures bracket sets 182 and 184 at a desired position.

[036] Vertically extending clamp plates 178, 180 may be formed of an elastomeric material so as to better grip objects placed on shelf member 164 and

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provide for cushioned impact of shelf member 164 with other objects. Further, straps (not shown) may be placed through appropriate holes formed in each of clamp plates 178, 180 to further secure desired equipment on shelf member 164.

[037] As noted above, shelf member 164 may be coupled at a distal end by way of a connecting plate 172. A distal end of connecting plate 172 may include a bumper member 173 formed of an elastomeric material to provide for cushioned impact of the front of the shelf member 164 with other objects. Bumper member 173 may also function as a handle for shelf member 164. In accordance with one embodiment of the present invention, connecting plate 172 may include a control panel 186 for controlling the movement of suspension system 20. Such a control panel 186 may be configured as control panel 101 described above with respect to Fig. 2, and thus could include pushbuttons 102, 104 and toggle switch 106. Control panel 186 could be located proximal to a bumper member 173 to reduce the likelihood of unintentional operation through inadvertent contact. Further, necessary wires for control panel 186 could be run through or along one or both horizontal extending arms 168, 170 of shelf member 164. Medical servicing system 10 may include a single control panel (101 or 186) or multiple control panels (101 and 186).

[038] Proximal end of shelf member 164 may include a locking mechanism (not shown) for allowing vertical adjustment and locking of shelf member 164 at a vertical position on support column 152. Locking mechanism may be designed to require a tool to allow the vertical adjustment, or may be designed for vertical adjustment without the need of any tools. A locking mechanism not requiring tools may include a vertical rack formed along each track 160, 162 of support column 152

and two (2) pivotable tooth engaging members coupled to shelf member 164 and located adjacent a respective rack. The tooth engaging members could be spring biased to lock with its associated rack when shelf member 164 is in a horizontal position and unlocked when shelf member 164 is not in a horizontal position. Accordingly, shelf member 164 could be adjusted vertically about support column 152 by tilting the shelf member upward from horizontal and automatically locked into position upon movement of shelf member 164 back into a horizontal position. Vertical adjustment of shelf member 164 allows for shelving medical equipment or services having different vertical dimensions.

[039] Shelf members 164 may also be added or removed from support column 152. Fig. 4 illustrates a support column 152 having two (2) of the above described shelf members 164 attached thereto, but more shelf members 164 could be added, or one or both shelf members 164 could be removed from support column 152. This could be achieved, for example, by removing lower end cap 157 (Fig.4) of support column 152 and unlocking and lowering shelf member 164 vertically out of tracks 160, 162. Further, support columns 152 of varying lengths may be used in the system 10 depending on the number of shelves or other components desired.

[040] The above disclosed shelf member 164 can be varied in size to be only as large as required for a desired function. This minimized "footprint" of shelf member 164 is important in the operating environment where space is at a premium.

[041] Another type of servicing component attachable to support column 152 is shown in Fig. 4 and includes a display monitor shelf 166. Monitor shelf 166 may include extendable distal and proximal arms 185, 187 and a pivoting platform

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188 coupled to distal extendable arm 187. Pivoting platform 188 is designed to receive a standard sized video display monitor 190. A pivot 192 of pivoting platform 188 may allow for limited tilting and swiveling of pivoting platform 188 and monitor 190. For example, pivot 192 could allow for approximately 15 degrees of downward tilt from horizontal and 30 degrees of swivel to each side of a central position. Pivot 192 may also be centered for optimum balance of pivoting platform 188 and monitor 190, and may include an adjustable drag control that is free of drift. The data connections, in this case "video in" lines, may run from service module 100 along support column 152 to and along proximal and distal extendable arms 185, 187 to monitor 190. Extendable arms 185, 187 may be pivotably connected to one another to allow for extension of pivoting platform 188 away from support column 152. Further, proximal extendable arm 185 may be rotatably connected to support column 152 to allow for further positioning of pivoting platform 188. Coupling of monitor shelf 166 with support column 152 and vertical adjustment, addition or removal of monitor shelves 166 may be identical to that described above with respect to shelf member 164.

[042] It will be appreciated that various other servicing components may be attached to support column 152, for example, a flat panel type video display 194 (Fig. 7) could be coupled to support column 152 by way of a display arm 196 secured at a proximal end within vertical tracks 160, 162. Display arm 196 may provide for swiveling or tilting of video display 194. Alternatively, customized shelving may be coupled along support column 152. Customized shelving may

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include long shelves designed to support long equipment or heavy duty shelving designed for heavy equipment.

[043] Fig. 8 illustrates an embodiment of a mobile support structure or device, such as a mobile or wheeled platform or cart 200, in accordance with the present invention. Functions of mobile platform 200 may include: (1) assisting in the decoupling of equipment support assembly 150 from service module 100; (2) supporting equipment support assembly 150 in a vertical position during use of the equipment support assembly 150 without service module 100; and (3) transporting equipment support assembly 150 to desired locations, such as a different operating room or another service module. Mobile platform 200 includes a lower base member 202 having four (4) wheels 204 attached to its bottom surface. At least one of wheels 204 may be rotatable about a vertical axis to assist in steering platform 200, and at least one wheel 204 may include a brake mechanism for preventing rotation of the wheel, and thus preventing movement of mobile platform 200. Platform 200 also may include a vertically adjustable upper base member 206. Upper base member 206 may be connected to lower base member 202 by way of a set of cross links 210, 212. Vertical movement of upper base member 206 may be obtained by relative movement of one link of each cross link 210, 212. Such movement of cross links 210, 212 may be achieved through actuation of an electric, pneumatic, or hydraulic actuator 214 coupled to individual links of cross links 210, 212 to be moved. Upper base member 206 or lower base member 202 may include a retractable or detachable and storable towing handle assembly 216. Further, upper base member 206 may include an engaging element, for example, at least

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one spine member 218, 220 for mating with an engaging element receiver, for example, cavities 222, 224 formed in support column 152 and sized to securely receive spine members 218, 220. Alternatively, support column 152 could include an engaging element and the associated engaging element receiver would be formed in upper base member 206. The engaging elements should be sized to provide the dual purpose of aligning mobile platform 200 with support column 152 and coupling mobile platform 200 with equipment support assembly 150 so as to substantially prevent separation of equipment support assembly 150 from mobile platform 200 once equipment support assembly 150 has been decoupled from service module 100.

[044] Removal or decoupling of equipment support assembly 150 from service module 100 may be achieved by disconnecting appropriate electrical, fluid, and data lines extending between equipment support assembly 150 and service module 100 and adjusting the height of service module 100 via suspension system 20 to a decoupling height. The appropriate decoupling height may be programmed into the control of suspension system 20 so that the height is automatically achieved or signaled, when desired. Once service module 100 and equipment support assembly 150 are at decoupling height, mobile platform 200 is positioned directly underneath equipment support assembly 150 so that spine members 218, 220 are aligned with the mating cavities 222, 224 of support member 152. Actuator 214 is then activated to move cross links 210, 212 to raise upper base member 206 into contact with support column 152. Raising base member 206 beyond a height associated with supporting the full weight of equipment support assembly 150 by

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mobile platform 200 acts to begin decoupling of support column 152 from service module 100. By raising support column 152 in relation to service module 100 pegs 140 of service module 100 are moved downwardly through upper grooves 161 to lower opening 159 of support column 152. Once pegs 140 are vertically aligned with lower openings 159, support column 152 may be urged away or decoupled from service module 100.

[045] Once decoupled from service module 100, equipment support assembly 150 may be mobile to a desired location, such as another service module. Equipment support assembly 150 may be connected to electrical, fluid, and data lines while supported by mobile platform 200. Mobility of the equipment support assembly 150 provides flexibility in operating room scheduling, wherein specialized equipment for a certain medical procedure can be easily moved as one unit to different operating rooms.

[046] Connection or docking of equipment support assembly 150 to service module 100 from mobile platform 200 may be achieved through the following steps. Mobile platform 200 is positioned so that support column 152 is flush against recessed central portion 118 so that lower openings 159 of support column 152 are vertically aligned with pegs 140 of service module 100. Column support 152 may then be urged against service module 100 so that pegs 140 fully enter lower openings 159. Service module may then be raised, or mobile platform 200 lowered, so that pegs 140 travel upwardly to top portion 163 of upper grooves 161 in support column 152, and thus secure support column 152 to service module 100. Once support column 152 is coupled to service assembly 100, electrical, fluid, and data

lines may be coupled between equipment support assembly 150 and service module 100.

[047] Further decoupling and docking methods can be practiced according to the present invention. For example, mobile platform may include a vertically extending support structure including a vertical groove for fixedly receiving a rear portion of support column 152, and coupling and decoupling may be attained through movement of service module 100. In addition to the benefits described above in connection with decoupling equipment support assembly 150 from service module 100, such decoupling allows for the replacement of old support assemblies with new support assemblies incorporating the latest technological advances. Thus, a user of medical servicing system 10 would not need to replace the entire system in order to obtain the benefits associated with advances in the art.

[048] The components of suspension system 20, service module 100, equipment support assembly 150 and mobile platform 200 may be formed of any suitable material, such as aluminum.

[049] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. For example, positional control of the suspension system 20 may also be provided by a foot operated control device connected to the servicing system 10. Such a foot operated control device could include the same features as control panels 101 and 184 described above, but adapted in size to facilitate use by a foot. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

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